DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

The QE experience: worth a try?

IN-DEPTH ANALYSIS

Abstract

The ECB has decided to implement large-scale quantitative easing (QE) measures since March 2015 until September 2016. This unconventional monetary policy has had a variety of precedents, in the Japanese, UK and US economies. These experiments have been effective at modifying government and corporate bond yields, mostly in the UK and US and to a lesser extent in Japan. This conclusion is not context-free. The European QE has started in a deflation era which requires more activism and cooperation from the ECB and Euro area governments than in the UK and the US when their central banks embarked in QE. The success of the European QE will also depend substantially on the depreciation of the Euro and will require clear communication by the ECB that it is prepared to accept a large depreciation at least until the inflation rate goes back to its target.

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EXECUTIVE SUMMARY

- The ECB has decided to implement large-scale quantitative easing measures. The operations have started in March 2015 and should be conducted until September 2016 and in any case until the path of inflation is consistent with the target of the ECB, which is to achieve an inflation rate below but close to 2%. This unconventional monetary policy has had a variety of precedents, in the Japanese, UK and US economies. These experiments have been effective at modifying government and corporate bond yields, mostly in the UK and US and to a lesser extent in Japan. Their macro effects, either on GDP or on inflation, have generally been low or temporary. A few papers acknowledge the incidence of US QE on the US dollar exchange rate.
- Empirical assessments of former unconventional measures taken by the ECB are globally below expectations. First, Euro area banks already have very broad and very advantageous access to ECB liquidity through its monetary policy operations. Second, the weakness of credit in the Euro area is not simply the result of supply factors but also of demand factors. Sluggish activity and private agents' efforts to shed debt are holding back lending. The main objective behind the ECB QE shall be to drive up inflation expectations and fight deflation.
- According to the literature and own view, a few key messages from foreign QE experiments are worth mentioning.
- The first message is that QE's main channel has been the portfolio-balance one. However, this effect may not prove very strong in the Euro area. First, some countries, like Germany, already have historically low interest rates. Second, the requirement by commercial banks to maintain their capital ratios may also produce lower interest rates, not in Euro area countries, but outside of the Euro area, e.g. in the US and the UK where demand for bonds may increase after European banks may have sold parts of their European government bonds holdings to the ECB. Consequently, interest rates would not necessarily decrease in the Euro area, as would be expected, but the Euro would depreciate.
- Hence, the second key message is that the exchange rate channel will be crucial in the European context. Consequently, it may be recommended that the ECB does not prevent the Euro depreciation, though it may lead to higher exchange rate volatility. It certainly requires communication by the ECB on the persistence of a low main refinancing operations (MRO) interest rate ("forward guidance"), acknowledging the reliance of QE on the exchange rate channel.
- The third key message relates to the context in which QE measures have been implemented. In the US and UK, QE measures started when inflation, not deflation, was present in the economy. Under deflation like in Japan, the potential growing size of real debts burdens the policy mix as it fosters the government to resume fiscal consolidation. In the European context, it is certainly crucial that QE does not see its potential effects limited by a new wave of austerity because prices, currently going down, weigh on real debts.
- The success of ECB QE at driving up inflation and inflation expectations requires government interventions. An actual flexibility in the management of public deficits, with margins for maneuver to limit fiscal consolidation or to implement a fiscal expansion in some countries, may help the ECB to fulfil its mandate. To this end, the ECB might reinforce the effects of investment plans in the Euro area and notably the Juncker's Plan by making securities issued to finance investments (public or private) eligible to the assets purchase programme.

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1. INTRODUCTION

The gloomy economic situation in the Euro area with its deflationary risks (see iAGS 2015) brought the European Central Bank (ECB) to undertake a round of quantitative easing (QE). These measures, some of which may demand that the ECB take on risk – via the purchase of securities, e.g. Asset Backed Securities (ABS) – are controversial.

On the one hand, ECB QE is criticized on the grounds that the ECB is exceeding its mandate for price stability by subjecting the European economies to a risk of inflation stemming from the excess of liquidity put in circulation. In our view though, with an euro area inflation rate at 0.4% in 2014 and inflation forecasts at -0.1% and 1.3% for 2015 and 2016 respectively (EC, European Economic Forecast, Winter 2015), the risk of inflation is rather limited in the short and medium run. Such a debate on the risk of inflation had also been raised in the United States, notably by Charles Plosser, the President of the Federal Reserve of Philadelphia, but these views were not shared by other FOMC members and were at odds with economic and monetary developments.

On the other hand, ECB QE is advocated on the grounds that the ECB is providing the right response to help Europe's weak economic situation, while respecting the price stability mandate in the context of the current institutional framework. The inflation rate has indeed been far from the 2% target for a long period now. According to latest ECB staff macroeconomic projections, inflation is expected to remain under the ECB target in both 2015 and 2016. As stated by Ubide (2014) "by accepting a long period of low inflation, the ECB is either revealing a new, deflationary bias or not fulfilling its price stability mandate". The debate should then not focus on whether or not QE is justified but whether it will help the ECB to comply with its inflation mandate. It may be argued that this response has been too slow, that it is partly inadequate and that it should urge an institutional change. But the ECB response shows that the famous words pronounced by Mario Draghi in July 2012 ("whatever it takes") are matched by deeds.

The most relevant objective of monetary policy today is to fight deflation and avoid that the Euro area economy enters a Japanese-style long-term crisis. Will ECB QE help the Euro area to escape the Japanese trap?

After having reviewed the recent unconventional measures implemented by the ECB, in comparison with similar measures undertaken by the Federal Reserve, the Bank of England and the Bank of Japan, we discuss the effectiveness of these measures, drawing on the empirical literature. We conclude with some policy recommendations drawn from different QE experiences and by highlighting key challenges ahead for ECB monetary policy.

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2. THE MECHANICS OF QE

The literature has emphasized several channels through which QE may have an impact on the economy, but first, it might be useful to broadly define the mechanics of this unconventional monetary policy measure. QE is a monetary policy decision, which entails an expansion of central bank's balance sheet mainly through the purchase of financial assets (Treasury bonds or other securities) or through lending to the financial system. It is sometimes opposed to credit easing whereby the aim is to modify the composition of the assets of central bank. However, the expansion of central bank's balance sheet may also be accompanied by a change in the composition of its portfolio blurring the distinction between QE and credit easing. It should be noted that not all increases in the central banks' balance sheet may be qualified as QE even though they would be unconventional.

The potential effects of QE are well summarized by Joyce et al. (2011) or Krishnamurthy et al. (2014). They point out to several channels through which QE asset purchases could potentially affect economic activity:

1. Policy signalling effect: an announcement of large-scale asset purchases may be perceived as a signal of a more accommodative monetary policy and send the signal that monetary policy rate will remain low for a long period, at least until the end of the asset purchase program. This policy of "forward guidance" can also consist of announcing that the central bank benchmark rate will not be cut before an announced date or until the unemployment rate falls below a certain threshold (e.g. 7% of the working population as did the Bank of England since summer 2013) or announcing an unlimited conditional buyback of sovereign debt to limit the upward pressure on government bond yields (as was the case for ECB's Outright Monetary Transactions programme, launched in the summer of 2012, and yet to be used). Considering that long-term interest rates reflect expectations of future short-term interest rates, announcing large-scale purchases of government bonds should trigger a decline in long term rates, through the expectations channel.

2. Portfolio balance effect: if the central bank buys assets, portfolio arbitrage generates an increase in the prices of the assets concerned as well assets which are close substitutes, lower yields and, thus, borrowing costs. At the same time, higher asset prices increase the wealth of economic agents and thus their ability to generate more spending.

3. A liquidity effect: in creating money and buying assets, the central bank can quickly inject liquidity into the financial system.

4. A confidence effect: if economic agents think that the QE is a useful policy that can improve economic perspectives, its sole announcement can boost consumers and firms' confidence. They can consequently increase their spending. A confidence effect may also generate an increase in asset prices and decrease risk premia. If agents consider that monetary policy is powerful, they expect those measures to be successful in increasing inflation: rising inflation expectations translate into declining real interest rates. This channel was notably emphasized by Eggertson and Woodford (2003).

5. A bank lending channel: if QE's modalities allow the central bank to buy assets from non-banks (directly or indirectly), the bank-lending channel improves. Indeed, the banking sector will observe a rise of its reserves at the central bank, matched by a corresponding rise of deposits. Meanwhile, if non-banks' assets become more liquid, it could encourage the banks to grant more (new) loans than they would have done in the absence of QE.

6. A default channel: especially in the Euro area case, if QE positively affects both the long-term bond yields and macroeconomic perspectives, risk premia may decrease and thus lower even more the long-term bond yield. This will decrease the risk of sovereign default

and give leeway for a more accommodative fiscal policy as investors realise that there is a buyer-of-last-resort. In the Euro area, this would help to mitigate the risk of a liquidity squeeze or sudden stops, stemming from the fact that in the monetary union "governments issue debt in a currency over which they have no control" (as explained by De Grauwe, 2012).

7. An exchange rate channel: money creation also weakens the exchange rate, favouring net exports. This channel may be viewed as a consequence of the portfolio channel if rebalancing involves the purchase of foreign assets by the seller of the asset bought by the central bank. The seller is indeed searching for yield and may find more profitable to hold foreign assets, hence triggering a depreciation of the domestic currency.

It may be stressed that these transmission channels are not necessarily different from the transmission channels of "conventional" monetary policy measures. They are also complementary. The issue of which of this channel is the most important for QE remains an empirical issue.

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3. QE AT THE FED, THE BANK OF ENGLAND AND THE BANK OF JAPAN

The major central banks have resorted to various conventional and unconventional monetary policy measures that have increased and/or changed the size and composition of their balance sheets. Despite a wide array of measures, the effects of unconventional policy measures remain disputable.

3.1. Policy measures

Several types of interventions have been endorsed:

The Fed and the Bank of England decided to intervene, as a first step, mainly through – conventional – loans to banks facing liquidity problems. In a second step, these central banks engaged in purchases of securities on the markets to lower long-term interest rates and stimulate the economy. For example, the Federal Reserve established programmes to purchase US government debt (the first was launched in March 2009 and has been named QE-I; it was then followed by QE-II and QE-III) and mortgage-backed securities. In June 2014, the securities portfolio of the Federal Reserve was worth 4000 billion dollars, or about 90% of its balance sheet (Figure 1). Likewise, in January 2009 the Bank of England set up the Asset Purchase Facility, a very large-scale programme to purchase British government securities and to a lesser extent Treasury bills and corporate bonds. In July 2012, the purchase programme reached GBP 375 billion, or 90% of the BoE's assets (Figure 2). Currently, the BoE holds nearly 25% of issued debt.

Figure 1. Composition of the Federal Reserve's balance sheet assets



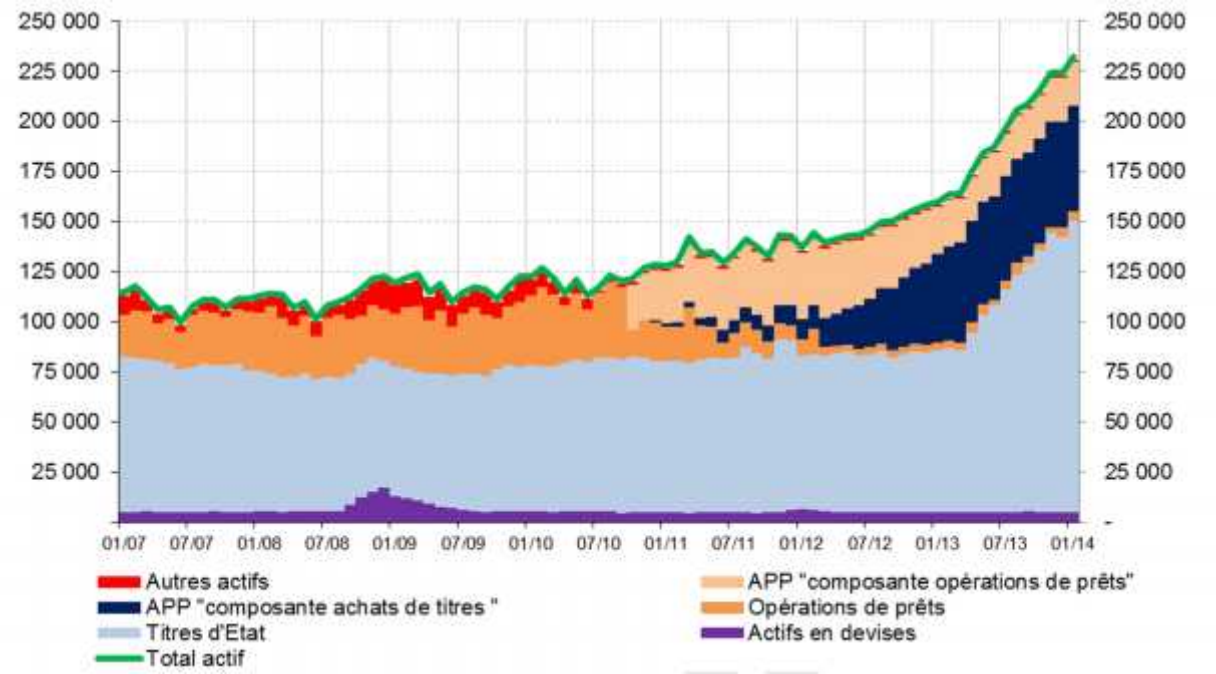
Source: Federal Reserve (Flow of Funds).

Figure 2. Composition of the Bank of England's balance sheet assets



The Bank of Japan operated in a slightly different fashion, in the context of deflationary pressures since mid-1990. The policy rate is close to zero since March 1999. In March 2001, the bank initiated a policy of massive purchases of securities (mainly Japanese government bonds), which led to a very substantial increase in the size of its balance sheet. Despite the onset of the global financial crisis, the size of the balance sheet remained almost constant until the end of 2010. During this phase, the short-term procurement programs (purchase of commercial paper and corporate bonds) have been launched; the Bank of Japan has also engaged in temporary purchases of Japanese government bonds. In October 2010, with the Asset Purchase Program (APP) the Bank of Japan started to purchase Japanese government bonds as well as corporate bonds, commercial paper and fund units invested in residential real estate. It also included a package of guarantees against loans to commercial banks for maturities up to 6 months (3 months against previous loans from the Bank of Japan). APP was interrupted in March 2013. At that time the outstanding APP value was worth 72 trillion yen (for a target of 80 trillion yen in late 2013). As part of Abenomics, Japan's central bank launched in April 2013 a new program, extremely proactive, the Quantitative and Qualitative monetary easing (QQE) programme (Figure 3). This programme aims to achieve an inflation rate of 2% at a two-year horizon. It consists in doubling in two years the monetary base in Japan through the doubling of the securities portfolio of the Bank of Japan (Japanese government securities mainly). As for the qualitative aspect of the program, the Bank of Japan is seeking to double, also on a two-year horizon, the average maturity of its portfolio of government securities. The monetary base in Japan has increased from 138 trillion yen to 202 trillion yen, between late 2012 and late 2013. According to projections by the Bank of Japan, it is expected to reach 270 trillion yen by the end of 2014.

Figure 3. Composition of the BoJ's balance sheet assets



3.2. Policy effectiveness

A large body of literature exists about the effects of unconventional monetary policy measures, which largely focusses on financial market reaction. The overall conclusion that can be drawn from these studies is that unconventional measures have usually had a significant impact on sovereign and private yields (portfolio balance effects), though this impact has been relatively short-lived. Impacts on inflation and real GDP have been less common, and of an insufficient size to compensate for the real costs of the global financial crisis.

It must be acknowledged that empirical research on this topic is not an easy task because it is difficult to disentangle the contribution of unconventional monetary measures from other simultaneous policies or shocks.

Hereafter, we classify the different studies according to the transmission mechanisms of unconventional monetary measures that they investigate.

Portfolio balance and signalling effects

For the US, Gagnon et al. (2011) show that Fed's assets purchases between 2008 and 2010 had several effects on Treasuries and corporate bonds. For example, they reduced 10-year interest rate from 30 to 100 basis points. Other studies confirm that asset purchase programmes reduced medium and long-term interest rates (D'Amico and King, 2010, who differentiate between short run (flow) and long run (stock) effects; Krishnamurthy and Vissing-Jorgensen, 2011, who report an overshooting effect of QE on Treasury bonds yields in contrast with MBS bonds yields; Altavilla and Giannone, 2014, who find significant effects on forecasts of bond yields one-year ahead of the announcement and implementation of accommodative measures). Comparatively, Hamilton and Wu (2012) conclude on rather small effects whereas Wright (2012) reports very short-lived effects.

Gagnon et al. (2011) also study Japanese and UK large-scale asset purchases. They report effects in the UK similar to the US, but only small effects in the case of the Japanese QE.

Oda and Ueda (2007) report a similar low, though significant, impact on Japanese government bonds yields.

For the UK, Meier (2009), with an event-study, shows that the announcement of the QE reduced the gilt yields by at least 60 basis points. Joyce et al (2011a) find similar results and estimate that long-term gilt yields fell by 100 basis points after the first announcement. They also find similar results on corporate bond yields and small reaction on the sterling exchange rate. Breedon et al. (2012) highlight a similar portfolio balance channel, but limited pass-through to corporate bond yields. Joyce and Tong (2012) use high-frequency data and show that QE measures have had long-lasting effects on gilt yields.

Macro effects

Given that effects of unconventional monetary policy need time to influence the macro variables, it is more difficult to point out some results than on the financial markets with an event-study. Nevertheless, Baumeister and Benati (2010) estimate that unconventional measures diminish both deflation risks and output recession in the US and in the UK.

Kapetanios et al. (2012) emphasize that in the UK, QE, in reducing medium-to-long-term gilt yields, had a positive effect both on real GDP (around 1.5%) and on annual CPI inflation (around 1.25 percentage points). Bridges and Thomas (2012) reach similar results. Joyce at al. (2011b) compare their SVAR approach with the two former papers and also find similar effects.

Schenkelberg and Watzka (2013) provide estimates of the Japanese QE at the zero-lower bound. They conclude that policy measures had a transitory effect on long-term interest rates, output and inflation and that QE was not successful at combating deflationary trends.

Bank lending channel

Bowman et al. (2011) report a bank lending boost after the Japanese QE of 2001, although the boost is found to be small.

Butt et al. (2014) test whether BoE's QE provided a boost to bank lending in the United Kingdom. They identify the effects of variation in deposits on individual banks' balance sheets and test whether this variation in deposits boosted lending. They find no evidence to suggest that QE operated via a traditional bank lending channel in the spirit of the model due to Kashyap and Stein. They suggest that QE operating through a portfolio rebalancing channel gave rise to flighty deposits and that this is a potential reason why they find no evidence of a bank lending channel.

Exchange rate channel

Neely (2015) finds that the US QE announcements of 2008-2009 weakened the spot price of the US dollar, and that these jump depreciations of the USD are fairly consistent with estimates of the impacts of previous equivalent monetary policy shocks. QE also had spill over effects via the reduction of international long-term bond yields. Fratzscher at al. (2013) also deal with the international spill over effects of US monetary policy. They assess the impact of US QE1 and QE2 on several financial variables to gauge whether the US unconventional measures have triggered capital inflows in emerging markets and other industrial countries. It should also be noticed that their empirical strategy allow them to assess the signalling as well as the portfolio channels. Three conclusions emerge. First, QE measures have had more effects when they were actually implemented than when they were announced, meaning that communication (and henceforth signalling channel) matters but implementation is crucial to trigger the portfolio rebalancing. QE1 and QE2 did not have the same impact on dollar exchange rate. Actually, QE1 triggered a global rebalancing

effect in favour of US equity and bond funds. Thus, the dollar appreciated against other currencies. The aim of the measures was indeed to provide short-term funds in dollars to address liquidity needs of international banks, which were short in dollars. Conversely, QE2 have triggered outflows and a dollar depreciation. Clearly, in the case of QE2, the Fed's purchases pushed investors to substitute Treasuries for more risky assets. This has triggered a portfolio rebalancing effect in favour of foreign assets.

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4. QE AT THE ECB

There are important differences in the nature of the measures favoured by the Bank of Japan, the Federal Reserve and the Bank of England, and the ECB. These differences result in large part from the financial structure of the economies in question. The ECB has for instance focused on supporting the banking system because of its major role in financing non-financial agents. In the United States, where market financing is predominant, the Federal Reserve has instead sought to influence market prices through the purchase of securities. It must also be stressed that the Euro area faced a specific situation with the outbreak of the sovereign debt crisis in 2010. It has led to a sharp rise in long term sovereign yield for the peripheral countries and thus impaired the transmission of monetary policy.

4.1. The early unconventional measures

For most of its efforts the ECB has relied on collateralized loans (i.e. against guarantees) to the banking sector. Since October 2008, auctions for monetary policy transactions have been conducted at fixed rates with full allotment (FRFA) to meet bank refinancing demands. In other words, as long as sufficient collateral is provided, all demand for bank liquidity is met. This policy is thus entirely dependent on the demand for liquidity coming from commercial banks, and thereby ruptures with the previous policy of a limited supply of liquidity to banks. Though new, this policy is not unconventional, insofar as it does not increase the size of the commercial banks' excess reserves, or the risk borne by the ECB. Beyond this FRFA policy, the ECB implemented unconventional measures when it decided to increase the maximum maturity of its loans (initially 3 months), with one-year liquidity operations carried out in June, September and December 2009 (LTRO) and three-year liquidity operations in December 2011 and February 2012 (VLTRO). Considering these measures, the bulk of the increase in the size of the ECB's balance sheet has been endogenous and did not reflect "active" policy.

The ECB has also created programmes to purchase securities: (i) secured bank bond purchases (called "covered bond purchase programmes", CBPP) in June 2009 and CBPP2 in November 2011 were designed as a further way of dealing with banks' financing costs, which were considered too high and thus incompatible with the orientation of monetary policy; (ii) the Securities Markets Programme (SMP) was launched in May 2010 to engage in limited buying of government debt on secondary markets, amounts that were supposedly sterilized by the ECB; the SMP was designed as a response to the pressure on sovereign debt markets, which called into question the smooth transmission of monetary policy in the Euro area; it may not be qualified as QE per se despite assets purchases, notably because the operations have been sterilized and did not entail a rise in the ECB's balance sheet (iii) Outright Monetary Transactions (OMT), a new conditional programme of buying sovereign bonds, announced in September 2012, which is intended to limit what are considered excessive risk premiums on sovereign debt bonds; (iv) finally, faced with the growing risk of deflation in the Euro area, the ECB decided on 4 September 2014 to implement a new programme to purchase the debt securities of European companies and residential real estate loans (Asset-Backed Securities Purchase Programme, ABSPP) and a new programme for purchasing secured bank bonds (CBPP3), with the aim of freeing commercial bank balance sheets of these debts and thereby encouraging them to lend to companies, in particular SMEs.

The multiplicity of the ECB's purchasing interventions at this stage could not hide the fact that programmes remained limited in scale: 100 billion euros were announced by the ECB for the CBPP and CBPP2 but effective purchases did not exceed 70 billion euros, 162,5 billion euros for the SMP (as stated in the initial announcement), an unlimited but unused

amount for OMTs and unspecified amounts for ABSPP and CBPP3, compared with about 1 trillion euros for the two long-term lending operations (LTRO), which contributed to increasing the size of the ECB's balance sheet (Figure 4). It follows that the ECB has done more to relieve the commercial banks than to directly support or revive financial market activities. Another point worth mentioning about unconventional measures implemented by the ECB is their timing. Indeed, the size of the ECB balance sheet has been substantially reduced since 2013, in sharp contrast with other major central banks.

The differences in technique between the central bank interventions reflect particular legal and economic factors—legal, because EU treaties prohibit the ECB from buying sovereign bonds on the primary market, and economic, as central banks seek to affect financing conditions as efficiently as possible. In the Euro area, banks provide the bulk of financing for private sector activity, which is why the ECB intervenes mainly by lending to the banking sector addressing liquidity needs and substituting for the interbank market. Conversely, finance for the US economy is more disintermediated, which explains the scale of the Fed's securities purchases.

Figure 4. Composition of the ECB's balance sheet assets



Source: ECB.

4.2. Effectiveness of ECB's unconventional measures decided before 2015

The most unconventional measures undertaken by the ECB in 2014 followed three different objectives in a deteriorating monetary environment: making monetary policy more accommodative, enhancing monetary policy transmission channels and reflating the economy. More precisely:

1. There had been an endogenous tightening of the monetary policy stance (through the reduction of liquidity needs from the banking system), inducing as a reaction:

   i. Injections of liquidity (end of SMP sterilization, LTRO, FRFA extension)

2. There had been a deterioration in the transmission mechanisms of monetary policy ("via the channel of bank credit"), inducing as a reaction:

i. Targeted LTROs

ii. Purchases of ABS and CBPP3

3. There had been an increasing gap between inflation and the ECB target and the medium-term economic outlook, inducing as a reaction:

i. Broad-based asset purchases (this is discussed in the next two subsections)

We describe hereafter their likely impact, before reviewing the existing empirical literature about earlier policies.

Injections of liquidity

The impact of the end of the SMP sterilization operation (which increases the reserves of the central bank) will increase liquidity and thus could push the EONIA rate towards the bottom of the interest rate corridor. But the effect is likely to be limited, because the excess liquidity will decline if the banks continue to repay the 450 billion euros from the existing very long-term refinancing operations (VLTROs). As banks already have access to virtually unlimited ECB financing and reimbursement, it is not very likely that new liquidity injections will have a significant impact on the economy, in the context of the current corridor.

Targeted LTROs

The TLTROs could have a potentially significant effect. The TLTROs are supposed to reduce banks' financing costs significantly. Indeed, on average, 4-year financing on the markets currently costs Euro area banks around 150 basis points. It can be expected that the TLTROs will reduce this cost. However, even if the banks use the TLTRO programme, it may not have the desired effect on the monetary policy transmission mechanism, as the banks may use the money to buy government bonds or other assets rather than increasing the supply of loans to households and companies. The fact that banks in the Euro area are currently reimbursing the 2011 and 2012 VLTROs suggests that there are barriers to lending today (mainly weak demand for loans), even though financing costs are low. However the main difference between the VLTRO and TLTRO involves conditioning the provision of liquidity in the latter on an amount of outstanding loans to the non-financial private sector (excluding mortgages), based on what the Bank of England did with its Funding for Lending Scheme (FLS) set up in summer 2012. Monetary policy transmission may thus improve. The first stage of TLTRO has been disappointing as demand for liquidity provided by the ECB, through this new operation, was relatively weak regarding what was expected by the ECB. The first allotment amounted to 82.6 billion euros in September 2014 against anticipations between 130 and 150 billion. In December, the allotment had increased to 130 billion but was still below the figures expected. Several arguments may explain why demand did not meet expectations. The first is that the banks already have very broad and very advantageous access to ECB liquidity through the monetary policy operations implemented by the ECB. Certainly the second and most important reason is that the weakness of credit in the Euro area is not simply the result of supply factors but also of demand factors. Sluggish activity and private agents' efforts to shed debt are restraining lending. It is also possible that banks are trying to reduce their exposure to risk.

ABS purchases and CBPP3

The new measures undertaken before 2015 supplement the TLTRO programme, as these purchases should allow substitution in the banks' balance sheets in favour of lending to the real economy. However, it is impossible at this stage to quantify the impact of these announcements. The purchases of covered bonds began in October 2014, while the ABS purchases will begin before the end of the year. The covered bond spreads have narrowed in response to these announcements. The purchases will continue for at least two years, but no details on their amount have been given.

Estimates of the current size of the ABS market vary, but are around the 1,000 billion euro mark, about half of which is traded on the financial markets. The quality of outstanding ABS securities varies, and not all will be eligible for ECB purchases. In addition, a large part of the existing shares are already used as collateral with the ECB.

More specifically, Mario Draghi announced on 4 September 2014 that the objective could be to raise the ECB's balance sheet to its level of early 2012. To do this would require increasing it from its current level by 1,000 billion euros. It seems doubtful that the combination of TLTRO programmes and purchases of ABS and covered bonds would enable the ECB to achieve half or more of the 1,000 billion euros of net expansion in the size of its balance sheet. This may then explain why the ECB has considered further measures in December and announced an extended QE (see below). The first tranche of the TLTRO programme has been disappointing (the ECB allotted 82.6 billion euros on 18 September 2014, and 129 billion euros on 11 December for the second tranche, the total being even smaller than the 2014 LTRO early repayments). The continuing deterioration of the macroeconomic environment will give motivation to the investors to hold their assets until the ECB's policy goes even further. To achieve a one trillion euro expansion of its balance sheet, the ECB needs to move to the next step of the plan set out by Mario Draghi in the Spring, i.e. "Broad-based asset purchases" (BBAP), and in order to reach the agreed target, the purchase of euro-area sovereign bonds will be included.

A few papers in the literature have so far been devoted to investigating the effectiveness of these early unconventional measures implemented by the ECB.

The portfolio balance and signalling effects

Peersman (2011) showed that increasing the size of the ECB balance sheet had persistent effects on interest rate spreads charged by banks, inducing an effect on liquidity. Pattipeiholy et al. (2013) conclude that LTRO and SMP measures had the expected effects on government-bond yields, but only in the short term or the very short term regarding the latest. The SMP measures are reported to have had an effect "within a few weeks", in Italy and Spain. Altavilla et al. (2014) study the implications of OMT announcements and find a rather strong effect on Italian and Spanish government bond yields (about 2 percentage points). They also show that these measures had no effect on Germany and France: OMT announcements had the expected effects of alleviating the burden of "crisis large countries" of the Euro area periphery. Szczerbowicz (2012) reaches a similar conclusion: central bank interventions in sovereign market are more effective in peripheral countries with relatively high risk premium. She also reports that SMP measures and OMT announcements lowered long-term borrowing costs for banks, with the largest impact in the peripheral countries.

The risk channel

Krishnamurthy et al. (2014) report quite substantial impacts of SMP and OMT on government bond yields, whereas the LTRO would only have had small effects. They go beyond the portfolio balance effect and investigate the risk channel. Their contribution is to shed light on the decomposition of the policy-induced yields change. They look for three

main components: change in the probability of default; currency redenomination risk (e.g. exiting the Euro area); and segmentation risk (e.g. bonds falling below the minimum rating to be accepted as collateral by the ECB). They show that in Italy and Spain, default and segmentation risks played a crucial role in the impact of SMP and OMT. In Portugal and Spain, the redenomination risk also played a role. Finally, and contrary to some beliefs that ECB unconventional measures can be regarded as transfers from the Euro area core to the periphery, Krishnamurthy et al. (2014) report positive spill over effects via increasing stock returns in the core countries.

Macro effects

Giannone et al. (2012) construct a measure of non-standard monetary policy that highlights the increasing role of the ECB as a financial intermediary. Then they report "small but significant" effects of this ECB policy on loans and economic activity. Bank loans to households and non-financial corporations are found higher than without non-standard monetary policy, while industrial production would have been 2 percentage points higher and the unemployment rate 0.6 percentage points lower.

Gambacorta et al. (2014) find that increasing central banks' balance sheets led to temporary increases in economic activity, but also to increases, though weaker and less persistent, in prices. Though ECB measures have been different from other central banks, like the Bank of Japan, the Bank of England and the Federal Reserve, they reach similar conclusions whatever the country they study.

4.3. The unfolding QE

The latest three waves of unconventional operations implemented by the ECB since June 2014 have focused more directly on the acquisition of corporate securities, which means bypassing the banking sector (while euro area sovereign bond are mainly held by the banking sector). This workaround should hopefully strengthen the transmission of monetary policy to the real economy, raise the size of the balance sheet and help avoid the risk of deflation in the Euro area. During the third wave of unconventional operations, a large-scale QE has finally been announced.

Two monetary policy decisions were announced by the ECB on 22 January 2015: (i) an expansion of its asset purchase programme to include sovereign, supranational and agency bonds; and (ii) a change in the pricing of the six remaining targeted longer-term refinancing operations (TLTROs), removing the 10bp spread over the main refinancing rate.

The programme of asset purchases has, as expected, been expanded to include sovereign, agency and €A-wide supranational bonds, to complement the existing programmes for asset-backed securities and covered bonds. It may then be compared in size with the QE3 implemented by the Federal Reserve from September 2012. Purchases of these new asset classes will be €60bn per month and will begin in March 2015, and are open-ended and linked to the ECB's inflation objective, although they will last at least until September 2016 ("will in any case be conducted until we see a sustained adjustment in the path of inflation which is consistent with our aim of achieving inflation rates below, but close to, 2% over the medium term"). Securities purchased under the extended programme will have a maturity between 2 and 30 years. Mario Draghi confirmed that securities with negative yields would be eligible for purchase. There will be some risk-sharing: 80% of the additional sovereign purchases will be made by national central banks and only 20% of the additional purchases would be subject to risk-sharing. This programme thus departs from the default mode of full risk-sharing. In that sense, it is unlike the OMT, where risk-sharing was central. Holdings of government, agencies' and international institutions' securities will be valued at amortised cost, preventing losses resulting from market valuation changes. The purchases of sovereign and agency bonds will be scaled to each NCB's share in the

ECB's capital. There are a number of conditions. For Greece, purchases can be made as long as the waiver remains in place, that it remains in a financial assistance programme, and that there is no breach of an issuer limit. More generally, purchases of the bonds of countries subject to a financial assistance program will be paused when that program is under review.

To get agreement on the programme, the ECB had to include some constraints on its purchases, including the constraint not to buy more than 25% of a given bond issue so as to avoid having a blocking minority in collective action clauses. The ECB will not buy more than 25% of each country's eligible debt stock. For the smallest Euro area countries, this constraint will bind in a matter of months as they do not have large stocks of long-term debt. The ECB is also likely to hit its purchase limits for German debt around September 2016. The duration of the ECB's programme seems to have been calibrated based on these constraints. To extend QE beyond 2016 would either require relaxing the 25% purchase limit, allowing purchases to be directed to countries with the largest debt stocks, or buying other assets (e.g. corporate debt).

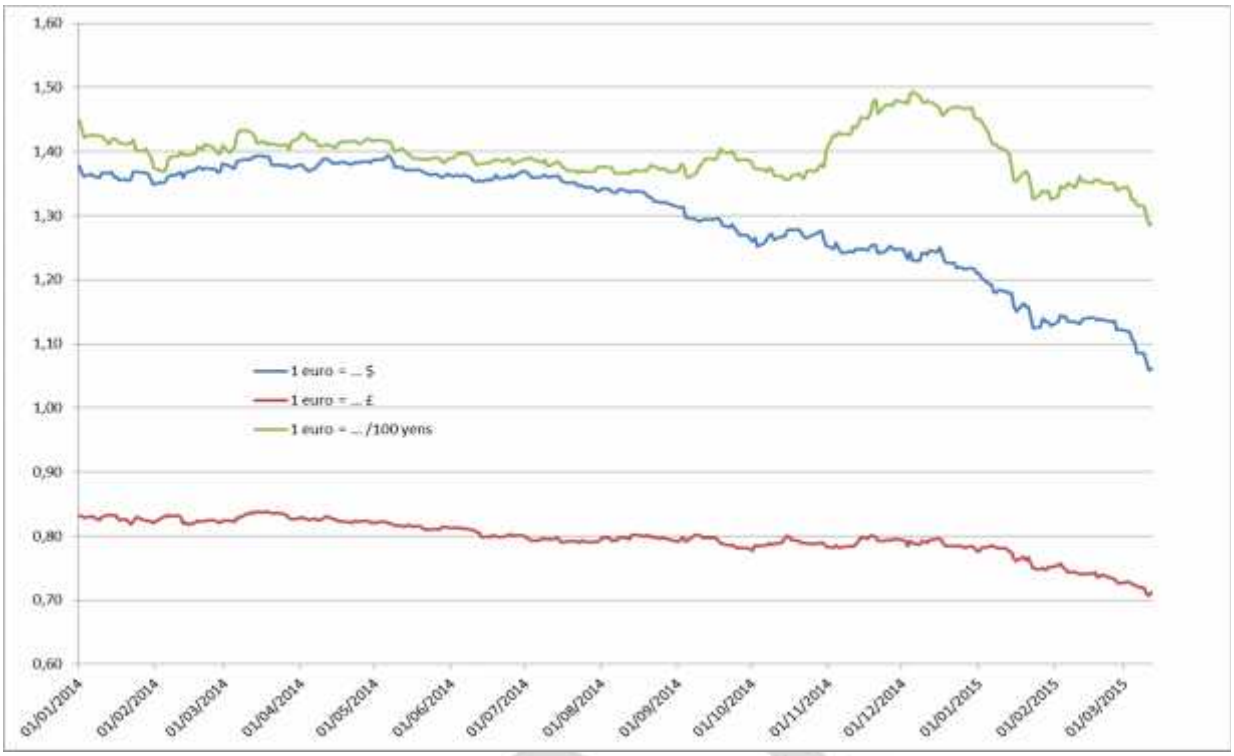
4.4. A preliminary assessment of the expected effects of ECB most recent QE

One of the main channels of ECB QE might be the signalling and portfolio rebalancing effects. With monetary policy diverging, higher US and UK yields may provide an incentive - following sales of Euro area and Japanese debt - to switch to UK and US bonds. In previous QE episodes in the UK and US, the four economies considered here were going in the same direction so emerging economies received the majority of carry-trade flows. Moreover, the ECB's QE purchases are large enough to exceed net debt issuance by the related countries. This is unusual compared with other QE episodes and implies that private investors will have to actively sell Euro area debt in order for the ECB to meet its purchase targets. The ECB will buy €800bn of sovereign debt over 2015-16, versus net issuance of around €350bn. It means that the private sector must sell €450bn. Within the Euro area, banks remain the largest domestic holders. If they reduce their holdings, they are most likely to switch into other zero-risk weighted assets in order to maintain capital ratios and so purchases of other AAA/AA rated sovereign debt are most obvious.

The exchange rate channel might be more powerful as monetary policy stances between large advanced economies are diverging. In the US and UK, the likely and expected future policy decisions are tightening. The continuous depreciation of the Euro over the last year could therefore continue and support Euro area exports. It might here be noticed that the depreciation started before the announcement of the QE, has been reinforced after and continued with the first round of asset purchases (Figure 5). It may indicate that these measures have been partly anticipated by financial markets. The ECB had indeed largely communicated during the second semester of 2014 that it stood ready to implement additional measures if it was judged necessary. The ECB has notably scrutinized the developments of inflation rate and inflation expectations. The fact that expectations have moved away from the 2% target (Figure 6) has certainly influenced and urged ECB decisions in order to keep prices anchored to the target.

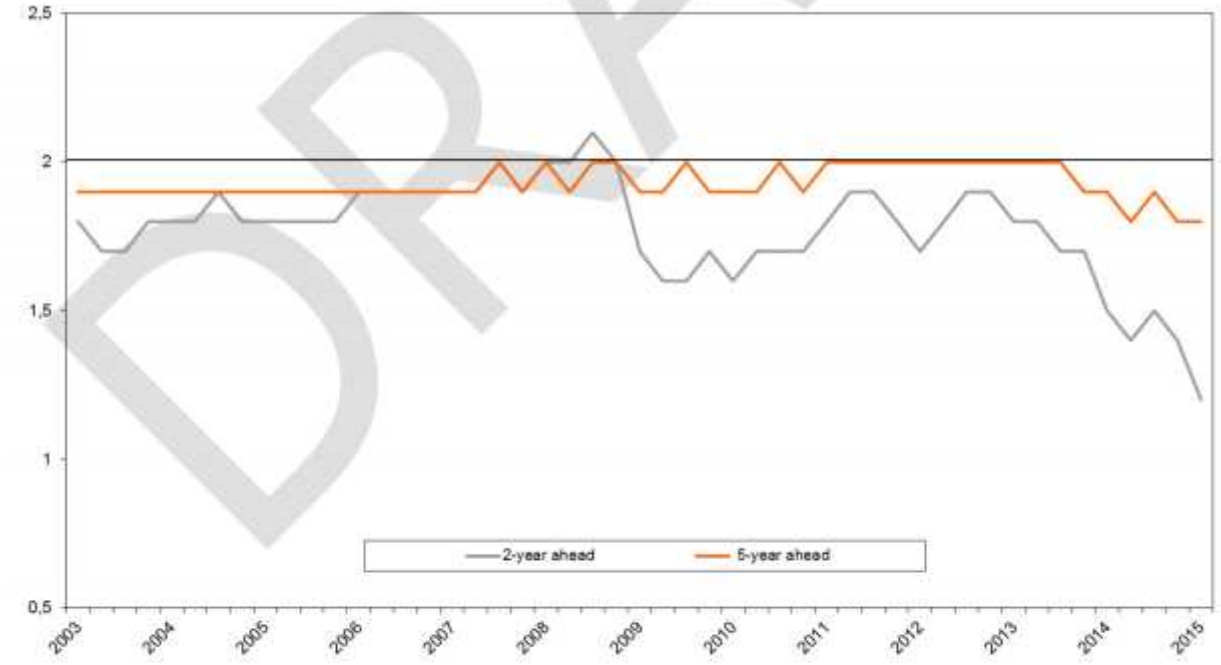
Last, the size of the ECB's QE program may also generate confidence among market participants, firms and households that the ECB will step in as much as necessary to preserve the unity of the European monetary union and sustain its economic conditions. Higher confidence among private agents may in turn drive higher consumption and investment.

Figure 5. Euro daily exchange rates



Source: Datastream

Figure 6. Inflation quarterly expectations



Source: ECB (Survey of Professional Forecasters)

5. KEY MESSAGES FROM FOREIGN QE EXPERIENCES

Drawing on BoE, BoJ, and Fed QE experiments, the first key message that shall be addressed to the ECB is that QE's main transmission channel has been the portfolio-balance one. However, this effect may not prove very fruitful in the Euro area. First, some countries, like Germany, already have historically low interest rates. A kind of zero lower bound on government bond yields may arise and limit the effectiveness of QE. Second, as stated in the previous section, the requirement by commercial banks to maintain their capital ratios may also produce lower interest rates, not in Euro area countries, but outside of the Euro area, e.g. in the US and the UK where demand for bonds may increase after European banks may have sold parts of their European government bonds holdings to the ECB. Consequently, interest rates would not necessarily decrease in the Euro area, as would be expected, but the Euro would depreciate.

Hence, the second key message is that the exchange rate channel will be crucial in the European context, and might even be reinforced by the portfolio rebalancing channel. A depreciating Euro vis-à-vis e.g. the US dollar may generate some inflation in the Euro area. Foreign experiments have not shown strong exchange rate channels, but this situation can be explained by a (relative) monetary synchronisation among the major central banks. In the current context of the European QE, with monetary de-synchronisation, the exchange rate channel may be expected to substitute for the less successful portfolio balance effect. Consequently, it may be recommended that the ECB does not prevent the Euro depreciation, though it may lead to higher exchange rate volatility. As a matter of fact, monetary policy de-synchronisation between the Euro area and the US may produce some overshooting à la Dornbusch, i.e. a sharp Euro depreciation in the short-run, followed by an appreciation towards the long-run exchange rate. Not preventing the Euro depreciation certainly requires communication by the ECB on the persistence of a low MRO interest rate ("forward guidance"), acknowledging the reliance of QE on the exchange rate channel.

The third key message relates to the context in which QE measures have been implemented. In the US and UK, QE measures started when inflation, not deflation, was present in the economy. In Japan, QE measures occurred against the backdrop of deflation. In the literature, QE has usually been found to be more effective in the US and the UK than in Japan. One important reason behind this assessment is the impact of deflation on debt. Under deflation like in Japan, the potential growing size of real debts burdens the policy mix as it fosters the government to resume fiscal consolidation. In the European context, it is certainly crucial that QE does not see its potential effects limited by a new wave of austerity because prices, currently going down, weigh on real debts.

On the contrary, in order to escape the deflation Japanese trap, more than an accommodative monetary policy is required, whatever the size of the accommodation. An expansionary policy mix is required. A key message for the Euro area from QE foreign experiments is indeed to endeavour to improve policy coordination between Euro area governments and the ECB. When inflation is positive, QE is able to alleviate the real costs of fiscal consolidation, via lower government and corporate bond yields. It has happened in the US. When deflation occurs and under the zero lower bound, QE cannot alleviate these costs. Hence, the success of ECB QE at driving up inflation and inflation expectations requires government interventions. An actual flexibility in the management of public deficits, with margins for manoeuvre to limit fiscal consolidation or to implement a fiscal expansion in some countries, may help the ECB to fulfil its mandate. It may be stressed that fiscal multipliers can be larger due to the expansionary monetary policy. It may then call for a stronger coordination between fiscal and monetary tools. To this end, the ECB might reinforce the impact of investment plans in the Euro area and notably the Juncker's

Plan by making securities issued to finance investments (public or private) eligible to the assets purchase programme.

Finally, Bech et al. (2012) have suggested that monetary policy effectiveness might be reduced when private agents are deleveraging. This was also emphasized during the Japanese crisis, with the problem of a fragile banking system. It is then of crucial importance to address this issue and to this end, the new role of the ECB, as financial supervisor, is important. The undercapitalization of the banking system, or at least of some institutions, should be addressed so that cooperation at all levels of economic policy implementation (government, central bank and financial supervisor) facilitates the success of monetary policy and the new QE.

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